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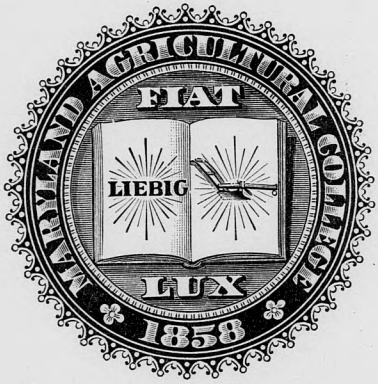

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ADDRESS

Chemical Department, Maryland Agricultural College,

COLLEGE PARK, MD.

NATURE STUDIES.

Prof. W. T. L. Taliaferro.

Of the many ways in which university extension work is projecting itself none is destined to be of greater and more lasting benefit to rural communities than the introduction of nature studies in the public schools.

Of all people in the world none should have a deeper interest in the study of nature than the farmer, who, more than all others is brought into immediate contact with her works and whose success depends so directly upon his working in harmony with her laws.

Yet, strange to say, while his schools have taught him the details of Asiatic and African geography, which can never affect him, and the dates of battles which have had and can have no bearing on his welfare, while they have taken hours and days of his youth to teach him the correct diagraming of a sentence and methods of arithmetic which are never used outside of a text book, they have ignored completely the very things upon a knowledge of which his business depends, and have turned him out either to work as a drudge in blind ignorance or to gather a scanty knowledge in the hard field of experience.

Fortunately there are many who do so learn. Practice and observation teach them, after much time and many losses, enough facts to insure a measure of success in their farming operations.

That, however, is not to be taken as an argument in favor of a continuation of the present course, but rather as proof of the necessity for a change, because it is shows the class of material there is to work upon, and what results might be generally expected under a better system of instruction.

It must not be understood, however, that nature study means the study of technical agriculture as a science, not indeed of any other science as such. It must not be understood that it is for the benefit only of those who live in the country. Nature in her myriad forms is around us everywhere, in the city and village as well as in the country, and everywhere she offers for those who study her secrets rich rewards, beauties of form and of harmony for surpassing any ever vouchsafed to the ignorant, sublime thoughts of God and his creations, sources of enjoyment which never fail, as well as great pecuniary profit.

It is in the country, however, that man is brought nearer to nature and nature's God, and it is in the country that opportunity best offers for its study, and it is eminently fitting that these studies should be introduced into the country schools. But, it is objected, our school courses are already overcrowded and our teachers and pupils overworked. There is no time for either to take up other studies. The most important things must come first.

In the first place nothing can be more important either as regards mental development or the facts learned. In the second place, in the hands of a skilful teacher, nature studies will not interfere with, but rather aid in the study of the ordinary branches.

How many teachers are there who have had afternoons when their pupils were tired and indifferent and lessons dragged, and the teacher herself was fretful and ready to do almost anything to arouse the school? Suppose in such a case she take from her desk a small bottle of lime water and six inches of small glass tubing, (a straw will answer) and pour the clear lime water into a tumbler. Instantly every pupil is on the alert and wondering what the teacher is about to do. She calls to her desk the sleepiest urchin and asks him to breathe through the tube or straw into the water and tells the others to watch the glass. In a few minutes the clear water has become milky before their astonished eyes. In a few words she explains that the breath comes from the lungs laden with carbonic acid gas which it has taken as an impurity from the blood and that the gas uniting with the dissolved lime form an insoluble compound whose fine white grains at first give a milky appearance to the water, and if left undisturbed will in a little while settle to the bottom of the glass. She then explains that with many persons in a close room the air is breathed over and over again till it becomes so full of carbonic acid gas that it no longer serves to purify the blood, and that impure blood is the cause of headaches and listlessness A window or ventilator is then opened and the children go back to their regular tasks with awakened energy and with a most valuable fact indellibly impressed upon their minds.

The whole incident has not occupied more than ten or fifteen minutes. The same experiment might be repeated another day and used to illustrate the facts of solids in solution and in suspension.

What little girl is there, who on her way to school does not sometimes stop to gather from the garden or fields a bunch of flowers to lay on the teacher's desk. The bright colors attract her and she thinks they will please her teacher also.

How much more interested the little girl and her classmates would be if the teacher in a five minutes talk would explain to them that the flowers put on their pretty dresses to attract not little girls to pull them, but bees and other insects to carry pollen from one flower to another, so they may produce seed. Then let the teacher ask what the bees get from the flowers to pay them for their trouble, and also what other means besides color, flowers have of attracting insects.

One day she might get the children to bring as many kinds of pretty and sweet-scented flowers as they could find. At another time she could show flowers of grasses or oaks and explain that since they depend upon the wind to carry pollen from one flower to another, they have neither perfume, nor bright blossoms, nor honey to attract bees, and she might then encourage the children to collect as many kinds of these wind-loving plants as possible. To her older pupils, she might explain how flowers may be artificially cross-fertilized and call attention to the fact that Livingston and other seedsmen have made thousands of dollars by thus producing new varieties of tomatoes, potatoes, and other fruits and vegetables. The illustrations but indicate the way in which nature studies may be presented, but they show how admirably adapted they are for awakening the interest of the pupil and for developing the powers of memory and observation and the relations of cause and effect. It is the ideal method of teaching. The pupil learns facts and acquires mental development and does not know that he has been taught.

Of course this work will require some expenditure of time and labor by the teacher in preparation, but it will be time well spent, for it will save time and weary labor in the school room and bring teacher and pupils into closer sympathy.

While it is contrary to the purpose that these studies should be taught with the method and exactness of a science, it is essential for the best results that there be a certain amount of method and system. Certain subjects will naturally present themselves at certain seasons of the year and it would be well for the teacher to select for each class subjects appropriate to the season and having a natural sequence in arrangement. Although the subject of nature study, is yet in its infancy, several excellent books to serve as teacher's aids, not as text books for pupils, have been published and can be obtained at a moderate price. In addition, several agricultural colleges, notably, Cornell University, have published leaflets presenting in a popular form subjects for nature studies, with suggestions as to the best methods of interesting pupils in them.

It is pleasing to note that the efforts of the Maryland Agricultural College to have nature studies introduced into the public schools of this State are meeting with a most gratifying success. Dr. Foreman, the State Director of Teachers' Institutes endorses them heartily and at his request and at the request of county examiners, lecturers from the College have introduced the subject at teachers' institutes in Garrett, Queen Anne's, Baltimore and Prince George's counties, and in each place have met with a most flattering reception.

Engagements have been made for similar lectures in other counties where institutes will be held during the winter, and there is abundant ground for the belief, that before the close of the present school year, nature studies will be actively in progress in many schools of Maryland.

Professor Austin of the State Normal school is an enthusiastic advocate of nature studies, and in his work at that institution pays special attention to systematic instruction in them. The result must be a wider and wider spread through our elementary schools of the many good effects to be derived from this line of work.

Like every innovation on established customs, nature study will find objectors, but since the study of nature is the study of truth and truth must prevail, the seed sown now being sown cannot fail to bear fruit in the better and higher development of the mental, moral and material resources of our beloved commonwealth.

"NATURAL PLANT FOOD,"

For about three years a concern styling itself the "Natural Plant Food Company" and later the "American Fertilizer Co., unincorporated," with headquarters in Washington, D. C., have been pushing the sale of their goods on a comprehensive scale, although the use of the goods in this State has been comparatively small. Reports have been made to this office from several localities to the effect that the so-called "Natural Plant Food" had been used, not only by the writer of the reports, but by neighbors as well, and that they had failed to see any beneficial results.

The advertisement of the company contains the most extravagant claims, among others the following: "There have been many official field tests made with it and it always came out ahead of all competition." We have failed to find any record of the "official tests" referred to.

The "Natural Plant Food" is pricipally Florida soft phosphate, but contains also some of the "Green sand marl." The analysis given on the bags is as follows:—

Moisture (H_2O) 1.78 per cent.
Oxide of Lime (C_2O) 29.16 per cent.
Carbonite Anhydride (CO_2) 4.00 per cent.
Oxide of Sodium (Na_2O) 1.32 per cent.
Silicie Anhydride (SiO_2) 9.77 per cent.
(Soluble in Hydrochloric Acid)
Oxide of Magnesia (Mg O) 4.62 per cent.
Alumina (Al_2O_3) and Ferric (Fi_2O_3) Oxides 5.14 per cent.
Undetermined Residue 25.21 per cent.
Total Insoluble Phosporic Acid (P_2O_5) 21.60 per cent.
Eq. to Bone Phos. of Lime ($Ca_3(PO_4)_2$) 47.15 per cent.
Total Insoluble Potash (K_2O) 1.00 per cent.
Eq. to Common Sulphate of Potash 2.00 per cent.

The Phos. acid and potash are all insolable by laboratory tests.

The above analysis is about an average one, we admit. The statement, however, that the (insoluble) potash is equal to commercial sulphate of potash, and the insoluble pho. acid is equal to bone phos. of lime are misleading, to say the least.

The statement of the complete analysis is entirely unnecessary. The potash present is nearly all insoluble and unavailable and probably not worth more than 20 cents per ton. The phosphoric acid, being practically all insoluble, is scarcely worth more than finely ground South Carolina rock phosphate. At this rate it is worth less than $5 per ton; commercially it is worth less, because it is not suited for making superphosphate.

Practically the only ingredient which we need to consider as of any value is the total phosphoric acid, which, as has been stated, is insoluble. The sand given in the analysis under its chemical name and formula

(SiO_2), certainly does not add to the value of the material, and the same is true in regard to the alumina and iron oxides.

The last analysis of "Natural Plant Food" made here is as follows:

Total Phosphoric Acid 18.68 per cent.

A previous test showed:

Total Phosphoric Acid 19.10 per cent.

It should be noted that in book of "Unsolicited Testimonials" as to the value of "Natural Plant Food" not a single address is given. The names, dates, States, and frequently the counties are given, but not the town or postoffice. Why not give the postoffice? Some one might be unkind enough to insinuate that the names and testimonials are fictitious.

Special attention has been called to the extravagant claims of "Natural Plant Food" by the State chemists of New York, New Jersey, West Virginia, Georgia, and others.

We extract the following from the Bulletin No. 108, of the New York Agricultural Experiment Station: "So far as experiments have been made, the soft phosphates are entirely inferior to acid phosphates and probobly not in any way superior to the form of finely ground phosphate known as floats."

"Glaucolite, the mineral which furnishes the potash in "Natural Plant Food," contains potash and iron in the insoluble form of silicate. This is more familiar under the name of 'green sand marl,' of New Jersey. Potash in this form is about as effective on crops as potash in granite, so far as we have evidence."

"The Ohio Exepriment Station has made a test of this matter and they conclude that 'the claim made for soft phosphate as a quick germinator is rather rash and that, as a matter of fact, it is inferior to the green house soil, without a fertilizer."

The Commissioner of Agriculture of Georgia in his report says that the claim of the promoters of this phosphate, that it is all available in the soil the first year is "an unwarranted one," and that it "closely approaches in character a finely ground phosphate rock."

If any of our readers contemplate trying this, or any other fertilizer, the value of which is questionable, we would suggest that the trials be made on a small scale at first.

ANNOUNCEMENT.

The results of analysis of the fertilizer samples collected during the fall, over 400 in number, will be published in our next number, which will appear February 15th. One copy will be sent to each one on our mailing list. Extra copies will be furnished by express, at $4 per hundred, if ordered before January 15th, 1899.

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ATTENTION IS CALLED TO THE SHORT COURSE OF TEN WEEKS IN AGRICULTURE. – Page 7.

Next term commences February 6th, 1899.

Particulars sent on application.

R. W. SILVESTER,

President Maryland Agricultural College.

CONTENTS OF THIS NUMBER.

	PAGE.
Nature Studies	2
Natural Plant Food	5
Announcement, M. A. C. Quarterly No. 3	6
The Short Course in Agriculture	7